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INTRODUCTION

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From Pithecanthropus—who appeared on earth half a million years ago and was already familiar with fire and the art of chipping stone tools—to the intrepid astronaut of tomorrow who will plant the banner of mankind on the face of the moon, the whole history of our civilizations has been essentially conditioned by two factors—scientific development and social progress. Though it has been operative at all times, never before has this dual influence weighed so heavily in the balance of man's destiny.

It is surely obvious that man, though the events in his history are often tragic and agonizing (even if it is to be hoped that the historian of the future will see them merely as so many crises overcome), is advancing towards greater freedom as regards both national independence and social organization. A certain kind of world unity has already been achieved, not, it is true, in economic and political organization or in men's sympathies but at least in the fact that the entire planet can now become aware—thanks to aviation, press and radio—of what is going on in its remotest corners.

The dramatic increase in our scientific knowledge since the beginning of the second world war is even more impressive and maybe more fraught with consequences than are the social developments of the same period. It is perhaps not generally known that there are in the world today some ten times more research workers than there have ever been in all the rest of human history put together: in other words, 90 per cent (in round figures) of all the scientists who have ever lived are still alive at this moment—a fact which can scarcely fail to revolutionize the fate of mankind.

But this is not all. It is generally admitted—or at any rate, it is not disputed—that these two driving forces in human evolution are interactive. Sooner or later, the pace and the nature of scientific discovery, at any time, give rise, in

ensuing periods, to the adoption of new techniques; and eventually, by way of innovations in agriculture and industry, transport and trade, medicine and education, the whole of our everyday, individual, family, professional and political life is transformed. Conversely, man's conception of science and the power of science changes with the society in which he lives. The attitude towards scientists, the material aid and financial backing given to them and the influence they are acknowledged to wield inevitably affect their creativity. There is thus a two-way flow between science and society.

This dialectical interchange between science and society does not, however always proceed smoothly, for the two systems are profoundly different both in nature and as regards their capacity for rapid change. Serious lagging behind, in some cases, or dangerous rushing forward, in others, may throw the whole of the machine out of gear, giving rise to all kinds of misgivings, some of them perfectly justified, others naïvely exaggerated. There are plenty of serious-minded people who find it regrettable that the leaders of nations and societies cannot adapt their countries to the acceleration of scientific progress; while others sometimes complain that science fails to take account of human nature, and is bearing our species to destruction. It must be evident to all that it is vitally important to be able to bring science and society into harmony by acting on their structures and the course of their development. To find a means of doing this is probably one of the major tasks of our time.

It cannot be done without acquiring a better understanding of the forces at work and their points of impact. There have, it is true, already been a fairly large number of books, articles and surveys drawing attention to these questions; but they have been in the nature of preliminary soundings, unco-ordinated, and with no general plan behind them. What is wanted is a new discipline, a branch of scientific study, of course, but distinct both from the traditional sciences—mathematics, physics, chemistry, biology, psychology and social science—and from economic and political practice. A review such as *Impact*—which is celebrating its tenth anniversary with this number—gives us a first sketch of such a discipline, destined to play a vital role in the future, in which some outline of what it is likely to become can already be discerned.

A glance at the index of articles published in the past 10 years shows that all the main problems which dominate our age and which will have to be solved in the fairly near future have already been brought up on its pages.

Hunger in the world; disease; the replacement of physical labour by the use of sources of natural energy, and of brain work by 'thinking' machines; the new tasks which will sooner or later take the place of activities for which there will be no need in future; and, finally, the general theme of the interaction of science and society and the need for bringing the two into harmony—this analysis of the present gives us a wide prospect of the future. Here again, it is instructive to look at the complete collection of *Impact*. Cybernetics, automation, electronic computers and information-processing machines, machine translation, operational research, nuclear energy and radio-isotopes, solar energy, new materials, astronautics, reclamation of arid lands, mechanisms of photosynthesis, cultivation of the alga Chlorella, soilless cultivation, antibiotics, experimental embryology and genetics as a means of transforming the physical and mental capacities of the man of the future—none of these subjects could conceivably have figured in scientific books or periodicals a quarter of a century ago. And how can we doubt that the progress of science and the achievements of technology in the decade to come will be every whit as enthrall-

ing? Scientists and thinkers of world renown, such as Sir Eric Ashby, Louis Armand, Pierre Auger, Niels Bohr, Lord Boyd-Orr, Louis de Broglie, Albert Einstein, Lord Halsbury, A. I. Oparin, R. Oppenheimer, Jean Rostand, Bertrand Russell, and others, have contributed to this great undertaking. The fact that their names appear in the table of contents of *Impact* is proof of their interest in our review, and of the importance they attach to the problem of the interaction of science and society. This interest is further emphasized by the quotations from *Impact* and the very favourable comments on it contained in the world press, including *El Comercio* (Lima), *Commerce* (Bombay), *Discovery* (London), *Information* (Paris), *Humanité* (Paris), *Le Monde* (Paris), *Nature* (London), *New York Times* (United States of America), and *Politiken* (Copenhagen), not to mention various specialized journals which have reprinted several articles.

National Commissions for Unesco, as well as other organizations—national, international, governmental and non-governmental—have likewise shown a keen interest in *Impact*, and have urged that every possible effort be made to increase its circulation.

Besides being cause for pride, this evidence of the trust placed in *Impact* lays on us an obligation to do ever better. We fully appreciate this obligation, and shall strive to show ourselves worthy of that trust.

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